

Best Practices From the APDR: Improving Medical Student Exposure to Interventional Radiology

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Educators in interventional radiology (IR) have been carefully planning for the IR residency since its approval in 2012 by the American Board of Medical Specialties as an independent field of residency training (1). Program directors and IR educators are currently hard at work creating exciting new educational opportunities in teaching, research, and patient care. One likely obstacle for the IR residency, however, will be its lack of formal exposure in the medical school curriculum, a problem that has plagued diagnostic radiology for decades. Studies have shown that medical students prefer meaningful contact with radiologists to help understand if the specialty is a good career fit for them 2, 3. However, most medical schools in the United States do not offer their students a dedicated rotation in interventional radiology, creating a challenge for IR educators to provide them with adequate exposure to the field before their decision on a specialty (4).

As with other medical specialties, the ease with which program directors can recruit medical students into IR will likely be cyclical and dependent on multiple factors, including students' perceptions of the field and the IR job market. Recruiting will always remain especially challenging for specialties like IR that do not have the luxury of a required clerkship in the medical student curriculum. Yet, adequate exposure to

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IR is essential for any medical student considering it as a career, for it is certainly among the most specialized of fields available to students through the National Resident Matching Program.

Students matching directly into IR without full knowledge of the responsibilities of patient care, workload, case mix, and complex team environment may be at increased risk of career dissatisfaction and ultimately of withdrawing from their training programs before graduation. Equally as concerning, students who may truly flourish in IR may never even have the opportunity to experience it if there is too little exposure in medical school. Even students who have no interest in IR as a career stand to benefit tremendously from learning firsthand how critically important it is to other medical specialties. Indeed, ensuring that students are adequately informed regarding a potential career in IR should be a top priority for IR residency educators.

As the number of accredited IR residency programs increases over the next several years, program directors will likely seek advice in how to effectively recruit students and provide them adequate exposure to the field before the match. Some IR programs have already begun devising novel ways to enable medical students to understand the complex IR environment. This paper outlines current best practices to ensure that students are adequately informed about IR before choosing it as a specialty.

IR Student Interest Groups

One important tool for optimizing student interest and exposure to IR is a robust interventional radiology student interest group (IRIG). Although certainly not a new concept for students looking to learn more about medical specialties, the presence of a student interest group specifically for IR may still be novel for many institutions. Student interest groups are vital low-stakes opportunities for students to learn about particular specialties, and for program directors to identify the number and the quality of local students who may be interested in their residency programs (5).

To be most effective, IRIGs require careful organization and investment of time from a departmental faculty liaison. IRIGs often coordinate many of the department-sponsored student activities such as IR

student lectures, hands-on simulation experiences, resident panels, match advice meetings, and opportunities with department faculty regarding shadowing, research, and mentorship. IRIGs also offer students the opportunity to connect with the IR community on a larger scale. For example, the Society of Interventional Radiology's Medical Student Council IRIG Committee offers support and resources to IRIGs throughout the country. Most IRIGs also offer students opportunities to strengthen their applications by holding leadership positions within their student-run executive committees.

IR Subinternships

Another long-established tool in medical education that is being adapted to improve student exposure to IR is the subinternship rotation. Much like a medicine subinternship, the premise of the IR subinternship (IR Sub-I) is to allow medical students to participate in the daily workflow of interventional radiology at the level of the junior resident. By assigning students responsibilities normally reserved for radiology residents, they cease to be passive observers on service and instead learn about the specialty by complete immersion in the day-to-day work of IR.

Several institutions have already created successful IR Sub-I rotations for medical students. They have integrated students into all stages of patient care, including preprocedure planning and patient evaluation, participation in cases in the IR suite, postprocedure patient monitoring and management, daily rounding on inpatients, and discharge planning. IR Sub-I students participate in most other routine aspects of the IR service as well, including outpatient clinic, inpatient consults, and multidisciplinary conferences. The IR Sub-I rotation provides students with first-hand experience regarding what a residency and career in interventional radiology might be like, allowing them to make informed career decisions.

IR Medical Student Symposia

A medical student experience that has quickly gained popularity over the past several years is the interventional radiology medical student symposium (IRMSS) 6, 7. The IRMSS is an intense 1-day IR conference designed specifically for medical students to provide them with basic IR lectures, hands-on

procedure simulation, and networking opportunities with IR faculty and trainees. Most symposia showcase IR residency program directors, passionate educators, and nationally known interventional radiologists to speak at their events in an effort to maximize student recruitment to the field.

Whereas some IRMSSs are conducted by single institutions, others represent collaborations of local, state, or regional IR residency programs. Multi-institutional IRMSSs allow for sharing of program costs and have produced unique and valuable educational sessions for students, such as IR program director panel discussions regarding the residency match and how students can improve their applications. Multi-institutional symposia are powerful tools for IR recruitment and exposure, offering exciting speakers on basic IR topics, engaging hands-on sessions, and the opportunity to meet and network with peers, career interventionalists, and IR program directors from multiple institutions in a single day.

Society of Interventional Radiology Resources

A central resource for many students interested in IR is the Society of Interventional Radiology's (SIR) Resident, Fellow, and Medical Student Section (RFS). Thanks in part to the well-organized SIR website, the SIR RFS offers numerous ways for students to learn about IR and to get involved in activities and leadership opportunities (8). IR program directors stand to benefit greatly from the foresight of early educators who invested so much time and energy in developing these engaging trainee resources for the SIR.

Medical students can learn about IR through membership in the SIR RFS Service Lines, traditional IR patient care areas that students can explore through organized educational activities such as monthly webinars, journal clubs, Angio Clubs, journal primers, survival guides, and vetted clinical and procedural resources. Students can also join the IR Medical Student Council, a student-run IR organization complete with its own newsletter, blog, grant and fellowship opportunities, and leadership positions available on eight standing committees. Other resources available through the SIR include webinars, journal clubs,

videos delivered through the RFS YouTube channel, information on the IR residency match, and the Mentor Match Program available through SIR Connect.

Integration of IR into the Medical School Curriculum

Although medical schools may be reluctant to allocate a dedicated month-long clerkship to IR, a strategy that may be nearly as effective in providing early exposure to the field is the integration of IR education into the existing medical school curriculum. Dedicated IR lectures or cases can provide students with valuable examples of applied clinical medicine, adding tremendous value to basic science clerkships or clinical rotations later in medical school. Some interventionalists have already sought such opportunities to teach students, arranging with their medical schools to discuss IR on other clerkships in ways that both enhance medical education and expose students to IR as a fantastic by-product.

Interventional radiologists at the University of Pennsylvania recently published their experience providing an IR lecture series to first-year medical students in gross anatomy, showing it to be an effective way to both provide IR exposure and generate interest in the field (9). At Emory University, IR has been integrated into the first-year Clinical Pathological Correlation course by creating a clinical case presentation of uterine fibroid embolization. The 20-minute presentation, produced in collaboration with their university media services, includes edited footage of the entire procedure and is described to students in person by a staff interventional radiologist. Also in the preclinical curriculum, second-year medical students at Emory can choose to shadow IR physicians as a part of their Foundations Elective, an experience that provides each student with a faculty mentor and includes at least 16 hours of shadowing experience. A similar shadowing opportunity is available to first-year medical students at Vanderbilt University as a part of their Careers in Medicine elective.

Third-year students rotating on the surgery clerkship at Emory enjoy a mini IR symposium of sorts, with activities including a 2-hour IR lecture, a discussion of IR clinical cases, and a hands-on “toolbox” session where they practice deploying coils, filters, and stents. Substantial inroads into the medical school

curriculum have occurred at both Mount Sinai and Vanderbilt University, where third-year medical students rotating on their core surgery clerkships now have the option to choose 2-week IR electives in lieu of more traditional surgery experiences. Duke University School of Medicine acknowledges the value of radiology by allocating an entire month of the second-year medical school curriculum to diagnostic radiology. The Duke radiology department structures the rotation so that every student spends 2 days of the clerkship on IR participating in basic service functions. At least one study has suggested that this required IR experience at Duke increases students' knowledge and awareness of IR later in medical training compared to students at schools who do not offer such an experience (10). Finally, the number of general IR electives and away rotations have increased exponentially at institutions nationwide in the past several years as the IR residency has officially commenced, providing programs a means to demonstrate to students a realistic picture of the IR work environment.

Conclusion

We are witnessing a rare event in graduate medical education: the birth of a major medical specialty's residency training program. Indeed, most specialties as fundamental to medicine as IR have long and rich histories of residency training. The IR residency is sure to have its challenges, however, as it is among the most specialized of all primary training programs in the match and yet does not benefit from a core clerkship in the medical school curriculum. This creates an inherent difficulty for IR educators to ensure that students have adequate exposure and knowledge of the field before they commit to residency training in interventional radiology. A secondary challenge will be attracting adequate numbers of students to the field in low recruitment cycles.

This paper shares best practices currently being used at institutions to ensure that students are adequately informed about IR before choosing it as a specialty. The paper includes several concepts long established in medical student education for other specialties but only recently adopted for IR. It also shares practices and resources that are novel to the recent IR movement, a testament to the pervasive sense of innovation that defines the field. Critical to the success of the IR residency program, however, will be the continued

strong educational commitment of radiology departments across the country, the ongoing sharing of best practices, and the unwavering support of SIR, Association of Program Directors in Radiology, and Association of Program Directors in Interventional Radiology, national organizations dedicated to trainee advocacy.

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